Ø. Maivizhi Selvi, Assistant Professor of Mathematics.

IV BSc Maths - Differential Equations Unit III.

Method of Variation of Parameters.

$$\frac{dy}{dx} + P(x)\,y = Q(x) \quad \text{---(1)}$$

$$y = e^{-\int P\,dx}\left(\int Q(x)\, e^{\int P\,dx}\,dx + C\right) \quad \text{---(2)}$$

We obtain the general solution of the linear differential equ is by the method of variation of parameters.

The corresponding homogeneous equ of (1) is

$$\frac{dy}{dx} + P(x)\cdot y = 0 \quad \text{---(3)}$$

or $\frac{dy}{y} = -P\,dx$ or $y(x) = Ce^{-\int P(x)dx}$.

(i) C.F is $Ce^{-\int P(x)dx}$.

∴ The general solution of (1) is

$$y(x) = V(x)\left(\int \frac{Q(x)}{V(x)}\,dx + C\right).$$

Second order linear differential equations

Consider the second order non-homogeneous linear equ $\frac{d^2y}{dx^2} + f(x)\frac{dy}{dx} + g(x)\cdot y = r(x)$ ---(1)

f, g and r are continuous on an open Interval I

Let us solve this by the method of variation of parameters.

The corresponding homogeneous differential equ is $y'' + f(x)y' + g(x)y = 0$ ——— (2)

Let the general solution of (2) be

$y = c_1 y_1(x) + c_2 y_2(x)$.

Now replace the constants c_1, c_2 by variable function $u(x)$ and $v(x)$.

Then $y = uy_1 + vy_2$ ——— (3)

Diff (3) $y' = u'y_1 + uy_1' + vy_2' + v'y_2$ ——— (4)

Determine u, v such that $u'y_1 + v'y_2 = 0$. ——— (5)

Then (4) becomes $y' = uy_1' + vy_2'$

Again $y'' = uy_1'' + u'y_1' + vy_2'' + v'y_2'$

Hence the given equ (1) becomes

$uy_1'' + u'y_1' + vy_2'' + v'y_2' + f(uy_1' + uy_2') + g(uy_1 + vy_2) = r(x)$

$u(y_1'' + fy_1' + gy_1) + v(y_2'' + fy_2' + gy_2) + (u'y_1' + v'y_2') = r(x)$ ——— (6)

Since y_1 and y_2 are solutions of (2),

$y_1'' + fy_1' + gy_1 = 0$

and $y_2'' + fy_2' + gy_2 = 0$.

Hence (6) becomes $u'y_1' + v'y_2' = r$ ——— (7)

Also we have $u'y_1 + v'y_2 = 0$ ——— (8)

Solving for u' and v' we have

$$u' = -\frac{ry_2}{y_1y_2' - y_2y_1'}$$

and $v' = \frac{ry_1}{y_1y_2 - y_2y_1}$.

Integrating, $u = -\int \frac{ry_2}{W}dx + k_1$,

$$v = \int \frac{ry_1}{W}dx + k_2.$$

Substituting in (3) we get the general solution of (1).

General solution is $y = c_1y_1 + c_2y_2$ where

$c_1 = -\int \frac{ry_2}{W}dx + k_1$; $c_2 = \int \frac{ry_1}{W}dx + k_2$

Here $W = y_1y_2' - y_2y_1'$ is called wronskian of y_1 and y_2 $(W \neq 0)$.

Solve $y'' + y = \sec x$ by the method of variation of parameters.

Solution: Solving the homogeneous equ

$y'' + y = 0$ we have the C.F

$y = c_1\cos x + c_2 \sin x$.

Hence $y_1 = \cos x$; $y_2 = \sin x$.

S. Yoga
Assistant professor of
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FUNDAMENTAL OF COMPUTER

CHAPTER – 1 : INTRODUCTION

DISADVANTAGE / LIMITATIONS OF A COMPUTER:

There is no doubt that a computer is fulfilling the promises to perform certain task better, faster and cheaper. But a computer has some limitations (ie) not possible to do certain jobs.

- PRODUCTIVITY :

  A Computer cannot be the replacement of Manpower. It cannot do the productivity work.

- REASONING :

  Even though a computer can do certain kind of work like man. But still lack many of the mental capabilities possessed by a five-years-old child. Simply we can say "Computer cannot think". They cannot discriminate or assimilate widely divergent kind of data, and they have absolutely no capacity for ethical evaluation.

- ERROR :

  A computer does not make error and also they do not check for an ERROR like people do. They use only the principle of logic; for example, 1 must always be equal to 1. If you type "one", the computer would not understand it. Every instruction must be precisely entered. The computer does not allow spelling mistake or typos. Many of the problems with computers occur because it cannot tell the difference between sensible work and unreasonable. Computers operate logically, but they are incapable of acting practically and reasonably.

CHAPTER – 2 : FIVE GENERATIONS OF COMPUTER

INTRODUCTION :

When a human race started doing trade, they need for a device. An early manual calculating device called *Abacus*. It was used more than 2000 years ago. After that slowly the mechanical calculator was developed. The following are the generation of computer:

- FIRST GENERATION (1945 – 1955):

  In 1946 two engineers at the University of Pennsylvania, build the first digital computer using parts called vacuum tubes. They named their invention ENIAC

(Electronic Numeric Integrator And Calculator). Consisting of 18,000 vacuum tubes, 70,000 resistors and it consumes of 160 kw of electricity power, it was a general purpose computer with a speed of 1,000 times faster than previous one.

The early electronic computer, such as ENIAC, EDVAC, UNIVAC, etc. used vacuum tubes to control the flow of electronic signals. These computers used thousands of vacuum tubes, and so the first generation computers were too bulky in size and used to produce lot of heat.

Because of this these computers could not be used further.

❖ SECOND GENERATION (1956 – 1963):

By 1948, the invention of the transistor came and greatly changed the computer development. The transistor replaces the large vacuum tubes. As a result, the size of computer became small. Transistor led to second generation computer that were smaller, faster, more reliable and more energy and efficient than before. And also it produces less heat.

❖ THIRD GENERATION (1964 – 1971):

Though transistors were clearly an improvement over the vacuum tubes, but still they generate heat, which damaged computer's internal parts. The introduction of Integrated circuits (ICs), also known as chips. A very large number of circuit elements – transistors, diodes, resistors, etc. could be integrated into a very small surface of silicon (IC). 'Third- generation' computer were based on IC technology. So this generation computer were smaller, faster and more reliable than second- generation computers.

❖ FOURTH GENERATION (1972 Onwards):

After the integrated circuits, the size of the computer had reduced. Initially about 10-20 components were contained in an IC. This technology was called as small-scale integration(SSI). Later it became possible to integrate up to 100 components in IC called as Medium-scale integration (MSI). Later for 30,000 components in one IC called as large-scale integration (LSI). Now with the advance technology it is possible to integrate up to 100,000 components in one IC (VLSI)Thus the fourth generation computer is based on this LSI chips around 1975. Because of this very small size of the IC's in fourth generation, they are very small, very powerful, fast and cheap. So an ordinary person can own a computer in fourth generation.

❖ FIFTH GENERATION *(Present & Future) :*

Scientist are working on the development of the fifth-generation computers that will have intelligence, ability to reason and learn, knowledge of the real world, and which can understand and talk in natural language. Fifth generation computers aim to solve high complex problems that require reasoning, intelligence and expertise.

CHAPTER – 3 : CLASSIFICATIONS OF COMPUTER SYSYTEM

TYPES :

1. Micro Computer.
   (i) Personal Computers (PC).
   (ii) Workstations.
   (iii) Portable Computer.
2. Mini Computer.
3. Mainframe.
4. Super Computer.

(See the handwritten Xerox.)

APPLICATIONS OF COMPUTER:

The use of computer is increasing in a wide range; the following are its application:

- In office and home for preparing documents.
- To perform data processing jobs.
- To prepare salary slips & salary cheque in office & factories.
- To maintain accounts & transfer funds in banks.
- To store and retrieve large amount of information in office.
- To send and receive e-mail/ fax.
- To search & retrieve information from other computers.
- To reserve transportation tickets (e.g) Railways, Airlines, etc.
- To create animation / cartoon movies.
- To compose music.
- To design automobiles, buildings & forecast weather.

UNIT-I

I-B.Sc Chemistry

General Chemistry - III

K. Anithashree Assistant Professor of Chemistry

ORGANIC COMPOUNDS:

Organic compounds in which a metal atom is directly linked to carbon are called organometallic cpds.

Eg:

C_6H_5Li — Phenyl lithium

C_6H_5MgX — Phenyl magnesium halide.

$(C_2H_5)_4Pb$ — Tetraethyl lead

Grignard reagents:

The alkyl (or) aryl magnesium halides are called Grignard reagents. They have the general formula

$$R-Mg-X$$

Where,

R - Alkyl (or) aryl gp.

X - Halides

Preparation:

Grignard reagents are generally prepared by treating magnesium with an alkyl (or) aryl halide in dry alcohol.

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Alkyl halide:

$CH_3I + Mg \xrightarrow{\text{Dry ether}} CH_3MgI$

methyl Iodide + Magnesium → Methyl magnesium Iodide.

Aryl halide:

$C_6H_5I + Mg \xrightarrow{\text{Dry ether}} C_6H_5MgI$

Iodo benzene → Phenyl magnesium Iodide.

Synthetic applications of Grignard reagents:

1. **Preparation of Hydrocarbons:**

Grignard reagents react readily with water or alcohol to form hydrocarbons.

(i) C_2H_5MgI (Ethyl magnesium Iodide)

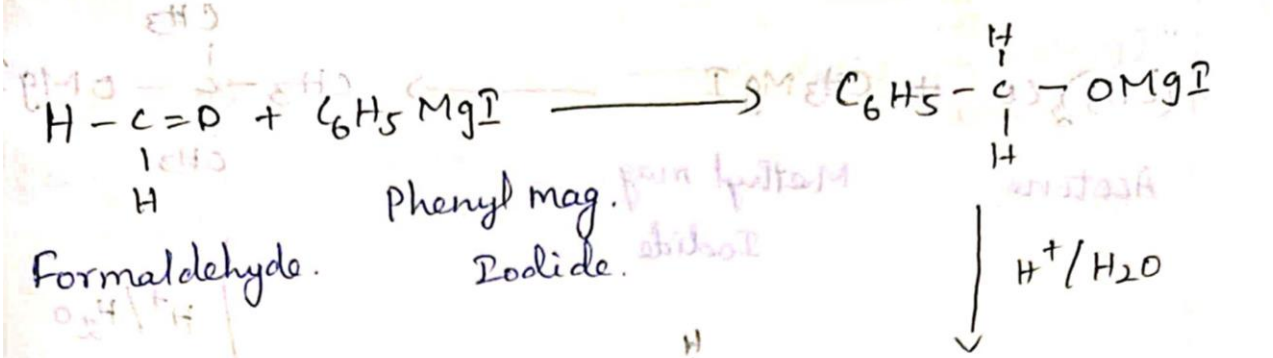
- $\xrightarrow{H_2O}$ C_2H_6 (Ethane) + $Mg(OH)I$
- $\xrightarrow{C_2H_5OH}$ C_2H_6 (Ethane) + C_2H_5OMgI

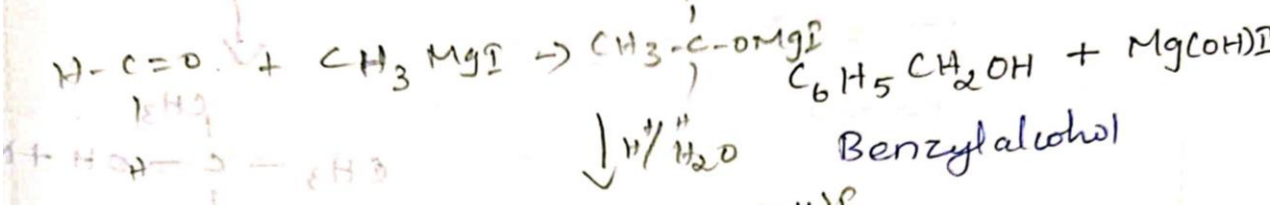
(ii) $C_6H_5MgI + H_2O \longrightarrow C_6H_6 + Mg(OH)I$

Phenyl magnesium Iodide → Benzene

2. **Preparation of Primary alcohols:**

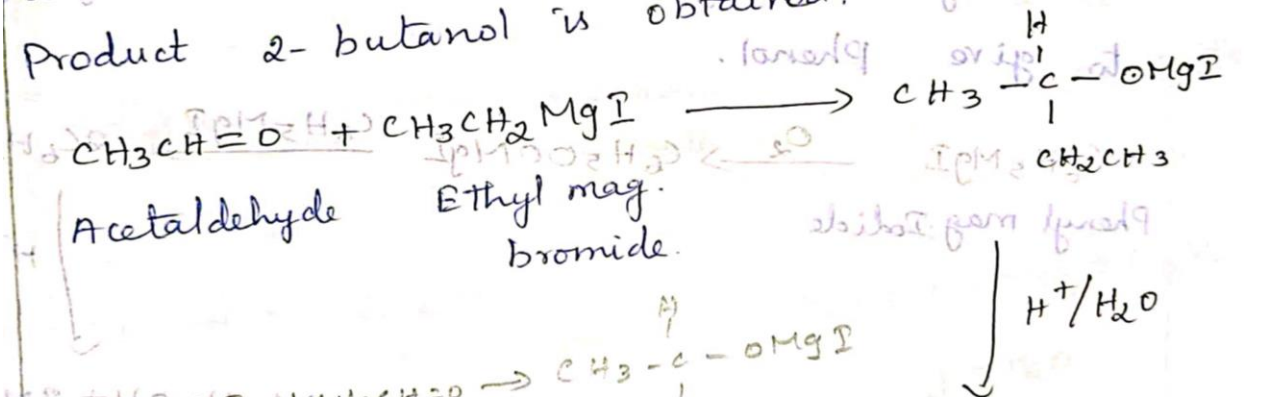
When a Grignard reagent is treated with formaldehyde to give Benzyl alcohol (1°-alcohol)

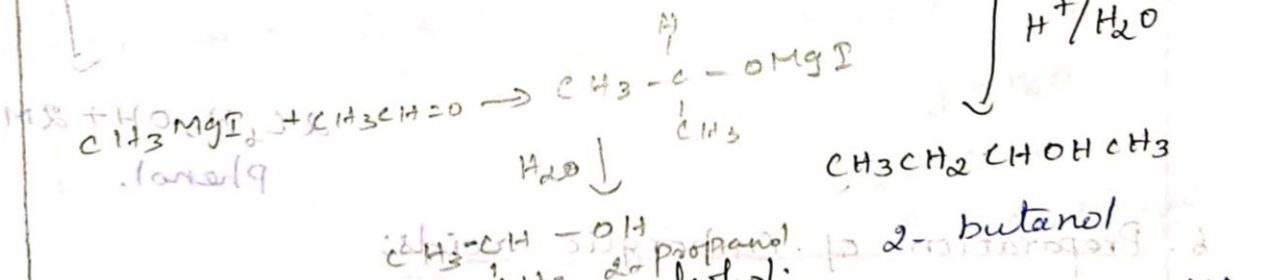




Preparation of secondary alcohols:

When a Grignard reagent is treated with an acetaldehyde followed by hydrolysis the Product 2- butanol is obtained.





Preparation of Tertiary alcohol:

When a Grignard reagent is treated with Acetone followed by hydrolysis to give t- butyl alcohol.

Name of the staff : D. Maheswari Assistant Professor of English

Subject - Chaucer and the Elizabethan Age

Class - I MA English

Antony and Cleopatra.

It was published in the year 1607. It is a great tragedy, by a renowned English playwright, poet and actor. His plays and poems remain popular to this day. He is called as 'The Greatest writer in English language' and 'The world's greatest dramatist'. The play was first performed, by the King's Men, at either the Blackfairs Theatre or the Globe Theatre in around 1607, its first appearance in print was in the Folio of 1623.

There are two main locations, Rome and Alexandria in Egypt. The overall tone of the play is deeply serious and tragic. The language is at times lofty an highly poetic. Romantic passion drives the main characters, Antony and Cleopatra. this passion is mixed with Cleopatra's fierce jealousy and possessiveness.

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"Literature is a comprehensive essence of the intellectual life of a nation".

This play seems to have a special place in Shakespeare's works, it is also a 'Roman Play' and also a 'Tragic Play'. The main theme of the play is the enduring nature of Love. The tragedy of Antony and Cleopatra details the affair between Antony of Roman fame, and Cleopatra, Queen of Egypt, and the ensuring complications that arise from the triumvirate that was formed after the assassination of Julius Caesar. Mark Antony becomes one of the three rulers of the Roman Empire after the death of Julius Caesar.

In love with Queen Cleopatra, and stays in Alexandria, and he ignores his duties. At last, Antony also dies and, Cleopatra uses poisonous snakes to commit suicide. Antony and Cleopatra are buried together.

General Prologue from the Canterbury Tales:

The General Prologue is arguably the most familiar part of the Canterbury Tales. It is the first part of the Canterbury Tales by Geoffrey Chaucer. It frames the longer story collection by setting the season, describing the pilgrims who will narrate the tales, and laying the ground rules of the storytelling contest.

The narrator opens the General Prologue with a description of the return the Spring. He describes the April rains, the burgeoning flowers and leaves, and the chirping birds. Around this time of years, the narrator says, people begin to feel the desire to go on a pilgrimage. Many devout English Pilgrims set off to visit shrines in distant holy lands, but even more choose to travel to Canterbury Travels to visit the relics of Saint Thomas Becket in Canterbury Cathedral, where they thank the martyr for having

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III - B.Sc Mathematics

Linear Algebra

Unit - I

Vector spaces

Definition :- A non-empty set V is said to be a vector space over a field F if

(i) V is an abelian group under an operation called addition which we denote by $+$.

(ii) For every $\alpha \in F$ and $v \in V$, there is defined an element αv in V subject to the following conditions.

a) $\alpha(u+v) = \alpha u + \alpha v \quad \forall\ u, v \in V \ \&\ \alpha \in F.$

b) $(\alpha+\beta)u = \alpha u + \beta u \quad \forall\ u \in V \ \&\ \alpha, \beta \in F$

c) $\alpha(\beta u) = (\alpha\beta)u \quad \forall\ u \in V \ \&\ \alpha, \beta \in F$

d) $1u = u1 \quad \forall\ u \in V.$

Remarks :-

(i) The elements of F are called scalars and the elements of V are called vector

(ii) The rule which associates with each scalar $\alpha \in F$ and a vector $v \in V$, a vector αv is called the scalar multiplication. Thus a scalar multiplication give rise to a function from $F \times V \to V$ defined by $(\alpha, v) \to \alpha v$.

Examples :-

1. $R \times R$ is a vector space over R under addition and scalar multiplication defined by

$(x_1, x_2) + (y_1, y_2) = (x_1 + y_1, x_2 + y_2)$ and $\alpha(x_1, x_2)$:

proof :- clearly the binary operation $+$ is commutative and associative and $(0,0)$ is the zero element.

The inverse of (x_1, x_2) is $(-x_1, -x_2)$

Hence $(R \times R, +)$ is an abelian group.

Now, Let $u = (x_1, x_2)$ & $v = (y_1, y_2)$ and Let $\alpha, \beta \in$

Then $\alpha(u+v) = \alpha[(x_1, x_2) + (y_1, y_2)]$

$= \alpha[(x_1 + y_1), (x_2 + y_2)]$

$= \alpha(x_1 + y_1), \alpha(x_2 + y_2)$

$= [\alpha x_1 + \alpha y_1, \alpha x_2 + \alpha y_2]$

$= (\alpha x_1, \alpha x_2) + (\alpha y_1, \alpha y_2)$

$= \alpha(x_1, x_2) + \alpha(y_1, y_2)$

$= \alpha u + \alpha v.$

Now, $(\alpha + \beta)u = (\alpha + \beta)(x_1, x_2)$

$= ((\alpha + \beta)x_1, (\alpha + \beta)x_2)$

$= (\alpha x_1 + \beta x_1, \alpha x_2 + \beta x_2)$

$= (\alpha x_1, \alpha x_2) + (\beta x_1, \beta x_2)$

$= \alpha(x_1, x_2) + \beta(x_1, x_2)$

$= \alpha u + \beta u$

Also $\alpha(\beta u) = \alpha(\beta(x_1, x_2))$

$= \alpha(\beta x_1, \beta x_2)$

$= (\alpha\beta x_1, \alpha\beta x_2)$

$= (\alpha\beta)(x_1, x_2)$

$= (\alpha\beta)u.$

obviously $1u = u$

$\therefore$ $R \times R$ is a vector space over R.

2) Let R^+ be the set of all positive real Numbers. Define Addition and scalar Multiplication as follows,

$u + v = uv \quad \forall \; u, v \in R^+$; $\alpha u = u^\alpha \quad \forall \quad u \in R^+$ & $\alpha \in R$. Then R^+ is a real vector space.

Proof :- clearly $(R^+, +)$ is an abelian group with identity 1.

Now, $\alpha(u+v) = \alpha(uv)$

$= (uv)^\alpha$

$= u^\alpha v^\alpha$

$= \alpha u + \alpha v.$

$\therefore$ $\boxed{\alpha(u+v) = \alpha u + \alpha v}$

$(\alpha+\beta)u = u^{\alpha+\beta}$

$= u^\alpha u^\beta$

$= \alpha u + \beta u$

$\therefore$ $\boxed{(\alpha+\beta)u = \alpha u + \beta u}$

I B.Sc Chemistry General chemistry - III

I Semester.

R. K. Kowsalya
Assitant Professor Of Chemistry

Methalurgy - Separation of Noble Gas

Dewar's Method.

The mixture of noble gases obtained by one of the method is separated into Indivicual constituents by the use of Coconut charcoal which absorbs different gases at different temperatures.

The mixture of noble gases is passed into double walled bulb containing coconut charcoal and placed in a low temperature bath at 173K. It is allowed to remain in contact with the charcoal for about elements of Group Zero half an hour. At 173K only argon, krypton and xenon are adsorbed by the charcoal while helium and neon remain unadsorbed. These are Pumped out and collected.

The mixture of helium and neon is kept in contact with coconut charcoal is at 93K which Completely adsorbs neon leaving free helium. The Charcoal at 173K containing argon, krypton and xenon is placed in contact with another charcoal at the temperature of the liquid air when argon diffuses into the other charcoal. The above method of Separation is due to Dewar and is known as Dewar's Method.

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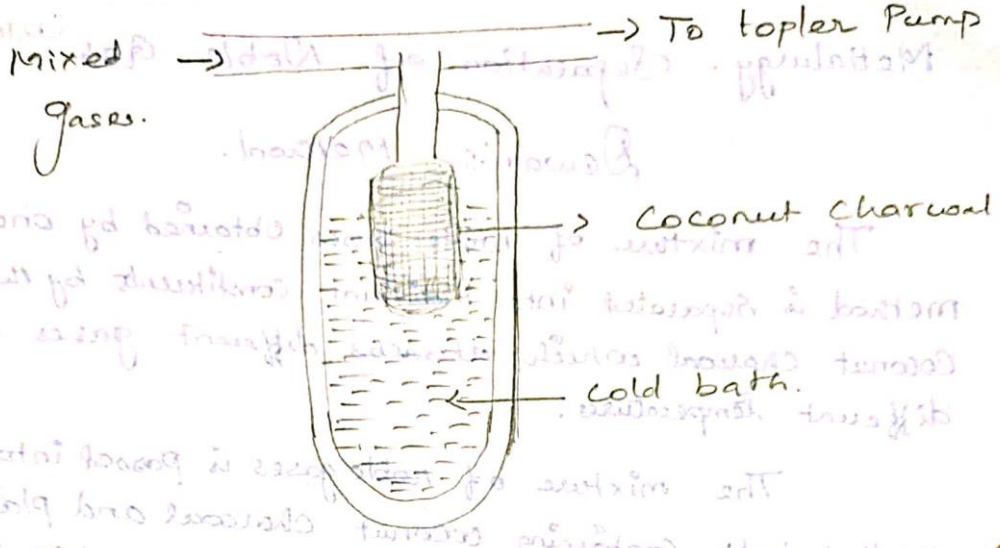
Separation of noble gases (Dewar's method)



Mixture of Noble gases.
(He, Ne, Ar, Kr, Xe)

Unadsorbed (He, Ne)
In contact with Charcoal at 93K

Adsorbed (Ar, Kr, Xe)
In contact with another Charcoal at liq. Air temp

Adsorbed Neon

Unadsorbed Helium

In 1st Charcoal Kr, Xe Temp raised to 183K.

2nd Charcoa Argon

Evolved Krypton

Remain adsorbe Xenon.

III B.Sc Chemistry - VI Semester.

Nanoscience & Technology.

Application of Carbon Nanotubes.

CNTs have extraordinary electrical & Thermal Conductivity, Strength, Stiffness and toughness. These extraordinary characteristics give CNTs potential in numerous applications.

* Field Emission & Shielding

The observed field emission by applying a small voltage to the carbon nanotubes is used to develop the effective flat panel displays, television and computer monitors.

* Conductive plastics.

The combination of plastics and carbon nanotubes are used in shielding composites, coating for enclosures, gaskets, electrostatic dissipation, anti-static materials, conductive coatings and radar-absorbing materials.

* Energy storage.

CNTs have high surface area, good electrical Conductivity and their linear geometry makes their surface highly accessible to the electrolyte. Therefore, CNTs are used as electrode in batteries and capacitors. They also have application in a variety of fuel cell components. It is used as Hydrogen storage materials.

N. Nandhini
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Computer Science

Secondary storage devices:

Advantages :

- Their storage capacity is virtually unlimited.
- With the low cost of tape reels and cartridges, and high data recording densities, the cost per bit of storage is very low for magnetic tapes.
- Since the tape reels and cartridges are compact and light in weight, they are easy to handle and store.
- Due to their compact size and light weight,they are also easily portable from one place to another.

Limitations :

- Due to their sequential access nature, they are not suitable for storage of those data, which frequently require to be accessed randomly.
- They must be stored in a dust-free environment, because specks of dust can cause tape-reading errors.
- They must also be stored in an environment with properly controlled temperature and humidity levels.
- They must be properly labled, so that some useful data stored on a tape is not erased by mistake.

Uses :

- For applications, which are based on sequential data processing.
- Backing up of data stored on an on-line storage device,so that , if by accident, the data is corrupted or lost, it can be retrieved from the backup tape.
- Archiving of data which are not used frequently.
- Transferring of data and programs from one computer to another, which are not linked together.
- Distribution of software by vendors.

Magnetic Disk

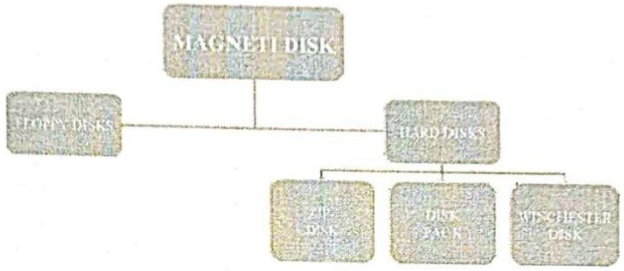
- Most popular storage medium for direct-access secondary storage. Due to their random access capability, magnetic disks are the most popular on-line secondary storage device.
- A thin, circular plate/platter made of metal or plastic, which is usually coated on both sides with a magnetizable recording material, such as iron oxide. Data are record on the disk in the form of tiny invisible magnetized and non-magnetized spots on the coated surfaces of the disk. EBCDIC is used for recording data. The disk itself stored in a specially designed protective envelope or cartridge, or several of them may be stacked together in a sealed, contamination-free container.
- Like magnetic tapes, magnetic disks can also be erased and reused indefinitely. Old data on a disk are automatically erased as new data are recoded in the same area. However, the information stored can be read many times, without affecting the stored data.

Types of Magnetic Disks :

Based on their size, packaging and material made magnetic disks are broadly classified into two types :

- **Floppy disks :** In floppy disks, disk is individually packaged in protective envelopes or plastic cases.

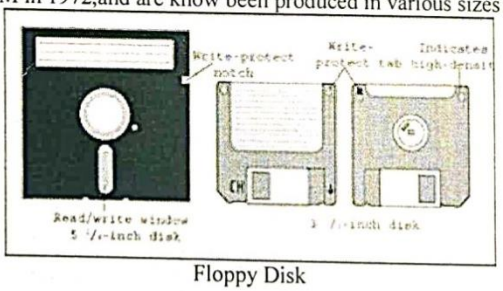
- **Hard disks :** In hard disks, disk may be packaged individually or in multiples, in cartridges or contamination-free containers. Depending on the type of packaging, hard disks are further classified into :
    - Zip/Bernoulli disks
    - Disk pack
    - Winchester disks.



Magnetic Disk

Floppy Disks

A floppy disk is a round, flat piece of flexible plastic, coated with magnetic oxide. It is encased in a square plastic or vinyl jacket cover . The jacket gives handling protection to the disk surface. Moreover, it has a special liner, which provides a wiping action to remove dust particles, which are harmful for disk surface and the read/write head. Floppy disk are so called because they are made of flexible plastic plates, which can bend, not hard plates. They are also known as floppies or diskettes. They were introduces by IBM in 1972,and are know been produced in various sizes and capacities by many manufactures.



Floppy Disk

3 ½ -inch floppy disk

- Most commonly used.
- Its diameter 3 ½ -inch.
- The disk encased in a square, hard-plastic jacket cover.
- The jacket cover has a cutout (aperture) for the read/write head to make contact with the disk surface.

- The aperture is covered with a sliding metal piece.
- When the diskette is inserted into the drive, the cover slides back to expose the disk surface to the read/write head.

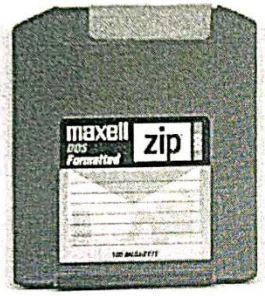
Now day floppy disks are out of trend.

Hard Disks

Hard disk are the on-line storage device for most computer system today. Unlike floppy disk, which are made of flexible plastic or Mylar, hard disk are made of rigid metal (aluminum). The hard disk platters come in many sizes, ranging from 1 to 14-inch diameter.

Types of Hard Disks :

Depending on how they are packaged, hard disk are normally categorized into the following three types :



Zip Disk

1. Zip/Bernoulli Disks: It is a single hard disk platter is encased in plastic cartidge. A commonly used zip disk is of 3 ½ inch size, having a storage capacity of about 100-250 MB, depending on the formatting style of computer system. Its disk drive is called a zip drive. A zip drive may be of portable or fixed type. The zip disk can be easily inserted into or removed from zip drive, just as we insert and remove floppy disks in a floppy disk drive or avideo cassette in a VCR.

2. Disk Pack : A disk pack consist of multiple (two or more) hard disk platters mounted on a single central shaft. Hence, all the disks of a disk pack revolve together at the same speed. As mentioned before, the disk drive of a disk pack has a separate read/write head for each disk surface ,excluding the upper surface of the topmost disks, and the lower surface of the bottommost disk. These two surfaces are not used for data recording in a disk pack. When not in use, disk packs are stored in plastic cases (as shown in figure). They are of removable/interchangeable type in the sense that they have to be mounted on the disk drive, before they can be used, and can be removed and kept off-line, when not in use. That is, different disk packs can be mounted on the same disk-pack drive at different instances of time. This gives virtually unlimited storage capacity to disk packs.

3. Winchester Disk : A Winchester disk also consists of multiple(two or more) hard disk platters mounted on a single central shaft. However, the main difference between a Winchester disk and a disk pack is that Winchester disks are of fixed type. That is, the hard disk platters and the disk drive are sealed together in a contamination-ree container, and cannot be separated from each other. Hence, as opposed to disk packs, which have virtually unlimited capacity, Winchester disks have limited capacity. However, for the same number of disk platters of the same size, Winchester disks can manage to have larger storage capacity than disk packs.

A. Jeni Nirmala Assistant professor of English -

① (A verb is the most important word in a sentence, because it denotes either the action or state of being of a subject.

A verb denotes the time of an action or state of being by undergoing some changes in its base form. Such changes in verb are called tense. They are past, present, future

The simple present Tense : S / V / S / es

This tense-aspect expresses actions that take place in the present time.

eg: I watch television in the evening

we always do the work sincerely

The usage of the simple present Tense:

I. Repeated actions or habits :

eg: The children always go to bed very late.

Birds usually build nests in the tree

II Statement of facts:

eg: The earth goes round the sun.

III present state of affairs:

eg: Mr. Sharma works in a bank.

IV Actions of fixed programmes:

eg: She goes to the college at 1.30 pm

she

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The present perfect Tense S + Have + has + ...

To express the completed actions with a particular reference to the present time.

ex: We have brought a house

John has gone to market

The Usage of the simple present Tense:

I. This tense aspect denotes recent past actions:

eg: I have written a letter to my parents

II. This tense aspect is also used to mention actions that took place further back in the past or condition that the action could be repeated in the present and future.

eg: I have seen the Taj mahal twice.

III. This tense aspect denotes most recently completed activities. We very often make use of just this type of actions.

eg: He has just gone out for lunch.

The present continious Tense

S + am + Are + Is + V + ING

1. To express an actions that is taking place at the time of speaking.

eg: I am talking to you now.
we are learning English at present

II This tense aspect may also speak about an action that is not necessarily taking place at the time of speaking.
eg: my cousin is doing her MBA in the state

III This tense aspect also denotes somebody's immediate plans.
eg: I am leaving for my home town this evening.

It is used to indicate uction start from the begning and contin the present and future it is not will do the action we call i
The present perfect continuous tense:

s+ have + has + been + v + ing

I To mention an action that started in the past which is still continuing upto the moment of speaking.
eg: I have been working in this organiza since 2006.

II To highlight four important time concepts.
eg: It has been raining since 7 o cloc

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II - CS.

CODE OPTIMIZATION

Criteria for Code-Improving Transformations

Simply stated, the best program transformations are those that yield the most benefit for the least effort. The transformations provided by an optimizing compiler should have several properties.

First, a transformation must preserve the meaning of programs. That is, an "optimization" must not change the output produced by a program for a given input, or cause an error, such as a division by zero, that was not present in the original version of the source program. The influence of this criterion pervades this chapter; at all times we take the "safe" approach of missing an opportunity to apply a transformation rather than risk changing what the program does.

Second, a transformation must, on the average, speed up programs by a measurable amount. Sometimes we are interested in reducing the space taken by the compiled code, although the size of code has less importance than it once had. Of course, not every transformation succeeds in improving every program, and occasionally an "optimization" may slow down a program slightly, as long as on the average it improves things.

Third, a transformation must be worth the effort. It does not make sense for a compiler writer to expend the intellectual effort to implement a code improving transformation and to have the compiler expend the additional time compiling source programs if this effort is not repaid when the target programs are executed. Certain local or "peephole" transformations of the kind are simple enough and beneficial enough to be included in any compiler.

Some transformations can only be applied after detailed, often time-consuming, analysis of the source program, so there is little point in applying them to programs that will be run only a few times. For example, a fast, nonoptimizing, compiler is likely to be more helpful during debugging or for "student jobs" that will be run successfully a few times and thrown away. Only when the program in question takes up a significant fraction of the machine's cycles does improved code quality justify the time spent running an optimizing compiler on the program.

Before we get into optimization as such we need to familiarize ourselves with a few things

ALGEBRAIC TRANSFORMATION

Countless algebraic transformations can be used to change the set of expressions computed by a basic block into an algebraically equivalent set. The useful ones are those that simplify expressions or replace expensive operations by cheaper ones. For example, statements such as

```
x := x +0
```

or

```
x := x*1
```

can be eliminated from a basic block without changing the set of expressions it computes. The exponentiation operator in the statements

```
x := y ** 2
```

usually requires a function call to implement. Using an algebraic transformation, this statement can be replaced by cheaper, but equivalent statement

```
x := y*y
```

3

A simple but effective technique for improving the target code is peephole optimization, a method for trying to improving the performance of the target program by examining a short sequence of target instructions (called the peephole) and replacing these instructions by a shorter or faster sequence, whenever possible.

The peephole is a small, moving window on the target program. The code in the peephole need not contiguous, although some implementations do require this. We shall give the following examples of program transformations that are characteristic of peephole optimizations:

- Redundant-instructions elimination
- Flow-of-control optimizations
- Algebraic simplifications
- Use of machine idioms

REDUNTANT LOADS AND STORES

If we see the instructions sequence

(1) (1) MOV R0,a

(2) (2) MOV a,R0

-we can delete instructions (2) because whenever (2) is executed. (1) will ensure that the value of a is already in register R0.If (2) had a label we could not be sure that (1) was always executed immediately before (2) and so we could not remove (2).

UNREACHABLE CODE

Another opportunity for peephole optimizations is the removal of unreachable instructions. An unlabeled instruction immediately following an unconditional jump may be removed. This operation can be repeated to eliminate a sequence of instructions. For example, for debugging purposes, a large program may have within it certain segments that are executed only if a variable debug is 1.In C, the source code might look like:

```
#define debug 0

....

If ( debug ) {

  Print debugging information

}
```

In the intermediate representations the if-statement may be translated as:

```
If debug =1 goto L2

Goto L2

L1: print debugging information

L2:                                   .....(a)
```

one obvious peephole optimization is to eliminate jumps over jumps .Thus no matter what the value of debug, (a) can be replaced by:

```
        If debug ≠1 goto L2

        Print debugging information

L2:                                    .....(b)
```

As the argument of the statement of (b) evaluates to a constant true it can be replaced by

```
        If debug ≠0 goto L2

        Print debugging information

L2:                                    .....(c)
```

As the argument of the first statement of (c) evaluates to a constant true, it can be replaced by goto L2. Then all the statement that print debugging aids are manifestly unreachable and can be eliminated one at a time.

FLOW-OF-CONTROL OPTIMIZATIONS

The unnecessary jumps can be eliminated in either the intermediate code or the target code by the following types of peephole optimizations. We can replace the jump sequence

```
        goto L2
        ....
L1 : gotoL2
```

by the sequence

```
        goto L2
        ....
L1 : goto L2
```

If there are now no jumps to L1, then it may be possible to eliminate the statement L1:goto L2 provided it is preceded by an unconditional jump .Similarly, the sequence

```
        if a < b goto L1
        ....
L1 : goto L2
```

can be replaced by

```
        if a < b  goto  L2
        ....
L1 : goto L2
```

Finally, suppose there is only one jump to L1 and L1 is preceded by an unconditional goto. Then the sequence

```
        goto L1

        .....

L1:if a<b goto L2

L3:                                    .....(1)
```

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DYNAMICS

UNIT - 1 THE LAWS OF MOTION

Force :

Force is any cause which produces or tends to produce a change in the existing state of rest of a body or of its uniform motion in a straight line.

Momentum :

The linear momentum of a body of mass m and the velocity V is the vector mV.

Newton's Laws of Motion :

Law 1 : Every body continues in its state of rest or of its uniform motion in a straight line, unless it is compelled by any external impressed force to change that state.

Law 2 : The rate of change of momentum of a body is proportional to the impressed force and takes place in the direction in which the force acts.

Law 3 : To every action there is always an equal and opposite reaction or the mutual actions of any two bodies are always equal and oppositely directed.

Principle of Inertia :

A body of its own accord, has no tendency to change its state of rest of of uniform motion in a straight line.

Parallelogram law of forces

If a particle be acted on by two forces represented in magnitude and direction by the two sides of a parallelogram drawn from a point, their resultant force is represen in magnitude and direction by the diagonal of the parallelogram drawn from that point.

Absolute unit of forces:

F. P. S system - Poundal
C. G. S system - dyne
M. K. S system - Newton.

Weight

The weight of a body is the force with which the earth attracts it.

Gravitational Units of Forces:

F. P. S system - Pound weight
C. G. S system - gram weight
M. K. S system - kilogram weight.

Principle of conservation of Linear Momentum

When the force acting on a particle is zero in a certain direction, the momentum in that direction will remain constant. This is known as the principle of conservation of linea Momentum.

Work:

If the force is constant, the work done by the force is defined as the product of the force and the distance through which the point of applic moves in the direction of the force.

Units of work:

F.P.S system - foot poundal

C.G.S system - erg

M.K.S system - gram. centimetre.

Power:

Power is the rate of changing doing work.

Energy:

The energy of a body is its capacity for doing work.

Kinetic energy:

If v is the speed of a particle of mass m, the expression $\frac{1}{2}mv^2$ is called its kinetic energy and denoted by the symbol T.

Potential Energy:

The potential energy of a particle is the energy which it possesses by virtue of its position and is measured by the work it can do in moving from its present actual position to some standard position. It is denoted by the symbol V.

Principle of conservation of energy.

If a particle moves under the action of a conservation system of forces, the sum of its kinetic and potential energies is constant throughout the motion.

Problem:

Find the power required to pump $6m^3$ of water per minute from a depth of 20m and deliver it through a pipe of cross sectional area $0.004m^2$ [The mass of $1m^3$ of water is $10^3 kg$]

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21 copies

INORGANIC CHEMISTRY

EAN RULE :-

The total number of electrons on the central atom including those gained from ligands in bonding is called effective atomic number.

$[Co(NH_3)_6]^{3+}$

EAN = 24 × 12 = 36.

Sidwick's concept of Effective atomic number : EAN concept (also called Noble gas rule :-

Sidwick suggested that after the ligands have donated a certain no. of electrons to be the central metal ion through bonding the total number of electrons on the central atom including those gained from ligands in the bonding is called the effective atomic number (EAN) of the central metal ion and in many cases this total number of electrons (i.e. EAN) surronding to coordinated metal ion is equal to the atomic number of the inert gas.

Eg :- EAN of Co(III) in $[Co(NH_3)_6]^{3+}$ can be calculated as follows

Electrons in Co atom = atomic number of Co = 27 e⁻s

Electrons in Co^{3+} ion 27-3 = 24 electrons.

Electrons donated by $6(:NH_3)$ = 2×6 = 12 "

EAN of Co(III) in $[Co(NH_3)_6]^{3+}$ = 24+12 = 36.

EAN (=36) of Co (III) is evidently equal to the atomic number of Kr.

Exceptions of EAN rule :-

Though in many cases the EAN is the same as the atomic number of the next inert gas. yet it is not always so- this total number of electrons i.e :- EAN may be a few units more (or) less than the atomic number of the next inert gas.

complexes of Ni(II), Co(II), Ag(I) etc which have more than one co-ordination number depending on the nature of the ligand. generatly do not follow the EAN rule.

Some metal atom such as Fe(III) which has its co-ordination number equal to 4 in $[Fe^{III}Cl_4]^-$

and equal to 6 in validity and exception of EAN concept in shown in table.

EAN rule as applied to carbonyls :-

metal carbonyls and its derivatives frequently obey EAN rule. By using this rule to metal carbonyls it is possible to predict whether a given carbonyl is a monomer.

Eg :-

The EAN rule of the central metal ion in the compounds viz. $Ni^{0}(CO)_4$, $Fe^{0}(CO)_5$, $Cr^{0}(CO)_6$, $Fe^{2+}(CO)_4Cl_2$, $Mn^{+}(CO)_5Br$, $Co^{0}(NO)(CO)_3$ & $Fe^{0}(NO)_2(CO)_2$ is 36. To estimate the EAN in this complexes it has been assumed that CO, Cl^- & Br^- contribute two electrons & NO, three electrons to the central metal ion.

$V(CO)_6$ is the only monomeric carbonyls which does not obey EAN rule.

metal carbonyls of $M_x(CO)_y$ type also obey this rule. eg :- the EAN of Mn in $Mn_2(CO)_{10}$ is 36 shown below.

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Summary of the play:-

The Strong Breed is the Self-Sacrificial Story of Eman. Eman is a teacher who came that village. At the outset of the play, Sunma, tries to convince Eman to leave the village before new year's festival begins at night. Being Jaguna's daughter, She knows that it is strangers who are normally used as carriers to cleanse the village from its sins. Sunma hates her village as she believes that it is quite evil, she does not agree with its cultural practices and rituals.

She works for Eman in his hut which he uses as a staffroom and clinic. Ifada, a crippled and homeless boy often finds space in Eman's hut. The play is marked with flashbacks between Eman's past and the present. Later we understand that Eman holds the lineage of strong breeds that are used as carriers. Eman's father was once playing the hereditary role as the 'carrier' of his village.

He ride a dwart boat, representing the sins of the Community. It was only seldom that such dwart boats returned safe, bringing the surviving carrier back. Eman refused to take over the hereditory role from his father. So he left the

village for 12 years and travelled many places. But his father's words reverberate in his ears: "Ours is a strong Breed my son... I hoped you would follow me... Stay longer and you will answer the urge of your blood".

The old man's words mean that Eman will certainly fulfil his duty among a community. The metaphor used by the old man also reveals that Eman cannot escape his destiny as a carrier. In one way or another, his final end is to be a carrier. Soyinka focus on this aspect of destiny of the individual who is doomed to meet it. with a new location and another time, Eman turns to be a carrier again.

Omae who was his childhood sweetheart had waited for Eman to come back all those years Eman had left the village soon after his circumcision and Omae to wait for him. later he marries her. Omae died during childbirth as all the females in the lines of the strong breed do. Eman left his village again. In the new village, he is a teacher & a healer, but still he is a stranger. Eman tries to rehabilitate Ifada in his place that later turns out to be the cause of his own sacrifice.

Ifada is a stranger and the villagers attempt to use him as the carrier but Eman chooses to take his place instead. There is also a sick girl in the scene who carries around an effigy that she is going to sacrifice during the festival so that she can be cured. Eman flees from the village elders as he is going to be sacrificed and has to be chased around the village for most part of the night. The sacrifice has to be carried out before midnight for it to effectively cleanse the villagers before the new year begins.

Finally, the elders decide to set a trap for Eman. They know that he is thirsty and will head for the river, they dig a hole and cover it with twigs. Eman goes to the river and falls into the trap, ultimately fulfilling his destiny as a carrier even though he is in a strange land. Wole Soyinka has justified the metaphysical link between the world of the living, and of the dead, and that of the unborn particularly found in the Yoruba cosmogai Also Soyinka delves deep into his yoruba culture and denounces the ~~ad~~ absurdity of some traditional practices; such as the ritual of human sacrifice.

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Topology
UNIT – IV

Countability And Separation Axioms:

Definition:

If a space X has a countable basis for its topology then X is said to satisfy the second Countability axiom, or to be second-countable.

Definition:

A space X is said to have a countable basis at x if there is a countable collection $\mathcal{B}$ of neighborhoods of x such that each neighborhood of x contains at least one of the elements of $\mathcal{B}$. A space that has a countable basis at each of its points is said to satisfy the first Countability axiom, or to be first-countable.

Definition:

A subset A of a space X is said to be dense in X if $\bar{A} = X$.

Theorem: Suppose that X has a countable basis. Then

(a) Every open covering of X contains a countable subcollection covering X.

(b) There exists a countable subset of X that is dense in X.

Proof: Let $\{B_n\}$ be a countable basis for X. (a) Let $\mathcal{A}$ be an open covering of X. For each positive integer n for which it is possible, choose an element A_n of $\mathcal{A}$ containing the basis element B_n. The collection $\mathcal{A}'$ of the sets A_n is countable since it is indexed with a subset J of the positive integers. Furthermore it covers X. Given a point $x \in X$, we can choose an element A of $\mathcal{A}$ containing x. Since A is open, there is a basis element B_n such that $x \in B_n$. Because B_n lies in an element of $\mathcal{A}$, the index n belongs to the set J, so A_n is defined. Since A_n contains B_n, it contains x. Thus $\mathcal{A}'$ is a countable subcollection of $\mathcal{A}$ that covers X.

(b) From each non-empty basis element B_n, choose a point x_n. Let D be the set consisting of the point x_n. Then D is dense in X. Given any point x of X, every basis element containing x intersects D, so x belongs to $\overline{D}$.

Separation Axioms:

Suppose that one-point sets are closed in X. Then X is said to be regular if for each pair consisting of a point x and a closed set B disjoint from x, there exist disjoint open sets containing x and B, respectively. The space X is said to be normal if for each pair A, B of disjoint closed sets of X, there exist disjoint open sets containing A and B, respectively.

Theorem: Let X be a topological space. Let one-point sets in X be closed.

(17)

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Atomic wrapper classes[edit source | edit]

With Java 5.0, additional wrapper classes were introduced in the `java.util.concurrent.atomic` package. These classes are mutable and cannot be used as a replacement for the regular wrapper classes. Instead, they provide atomic operations for addition, increment and assignment.

The atomic wrapper classes and their corresponding types are:

Primitive type	Wrapper class
`int`	`AtomicInteger`
`long`	`AtomicLong`
`boolean`	`AtomicBoolean`
`V`	`AtomicReference<V>`

The `AtomicInteger` and `AtomicLong` classes are subclasses of the `Number` class. The `AtomicReference` class accepts the type parameter `V` that specifies the type of the object reference.

Introduction to wrapper class in java:

Wrapper Class :

- Java uses primitive types, such as int, char, double to hold the basic data types supported by the language.
- Sometimes it is required to create an object representation of these primitive types.
- These are collection classes that deal only with such objects. One needs to wrap the primitive type in a class.
- To satisfy this need, java provides classes that correspond to each of the primitive types. Basically, these classes encapsulate, or wrap, the primitive types within a class.
- Thus, they are commonly referred to as type wrapper. Type wrapper are classes that encapsulate a primitive type within an object.
- The wrapper types are Byte, Short, Integer, Long, Character, Boolean, Double, Float.

These classes offer a wide array of methods that allow to fully integrate the primitive types into Java's object hierarchy.

Wrapper Classes

Each of Java's eight primitive data types has a class dedicated to it. These are known as *wrapper classes*, because they "wrap" the primitive data type into an object of that class. So, there is an `Integer` class that holds an `int` variable, there is a `Double` class that holds a `double` variable, and so on. The wrapper classes are part of the `java.lang` package, which is imported

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```
        System.out.println(x);
    }
}
```

Number Methods:

Here is the list of the instance methods that all the subclasses of the Number class implement.

SN	Methods with Description
1	xxxValue() Converts the value of *this* Number object to the xxx data type and returned it.
2	compareTo() Compares *this* Number object to the argument.
3	equals() Determines whether *this* number object is equal to the argument.
4	valueOf() Returns an Integer object holding the value of the specified primitive.
5	toString() Returns a String object representing the value of specified int or Integer.
6	parseInt() This method is used to get the primitive data type of a certain String.
7	abs() Returns the absolute value of the argument.
8	ceil() Returns the smallest integer that is greater than or equal to the argument. Returned as a double.
9	floor() Returns the largest integer that is less than or equal to the argument. Returned as a double.
10	rint() Returns the integer that is closest in value to the argument. Returned as a double.

11	round() Returns the closest long or int, as indicated by the method's return type, to the argument.
12	min() Returns the smaller of the two arguments.
13	max() Returns the larger of the two arguments.
14	exp() Returns the base of the natural logarithms, e, to the power of the argument.
15	log() Returns the natural logarithm of the argument.
16	pow() Returns the value of the first argument raised to the power of the second argument.
17	sqrt() Returns the square root of the argument.
18	sin() Returns the sine of the specified double value.
19	cos() Returns the cosine of the specified double value.
20	tan() Returns the tangent of the specified double value.
21	asin() Returns the arcsine of the specified double value.
22	acos() Returns the arccosine of the specified double value.
23	atan() Returns the arctangent of the specified double value.
24	atan2()

General chemistry - I

Semister - 1

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Important Formula and Problems of Chemistry

I Problems :-

1) An Organic compound has the empirical Formula CH_2O, and molecular weight is 90 g/mole. Find it's Molecular Formula.

Ans :- Data given :-

Empirical Formula = CH_2O

Molecular weight of the substance = 90 g/mole.

Calculation :-

Empirical Formula weight = CH_2O

$= [1 \times 12] + [2 \times 1] + [1 \times 16]$

$= 30$ g/mole.

$$n = \frac{\text{molecular formula weight}}{\text{Empirical formula weight}}$$

$$n = \frac{90 \text{ g/mole}}{30 \text{ g/mole}} \Rightarrow 3 \text{ g/mole}.$$

$\therefore$ n = 3 g/mole

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Molecular Formula = [Empirical Formula]$_n$

Empirical Formula = CH_2O, $n = 3$

Molecular Formula = $[CH_2O]_3$

= $C_3H_6O_3$,,.

Result:-

Molecular Formula = $C_3H_6O_3$.

2. An organic compound has the Empirical Formula CH and the molecular weight of the compound is 78.9 g/mole. Find it's molecular Formula.

Ans: Data given:-

Empirical Formula = CH

Molecular weight of the Substance } = 78 g/mole.

calculation:-

Empirical Formula weight } = CH

Molecular weight of the Substance } = 78 g/mole.

Empirical formula weight } = CH

$= (12 \times 1) + (1 \times 1)$

$= 13.9$ g/mole.

$$n = \frac{\text{molecular formula weight}}{\text{Equivalent formula weight}}$$

$$n = \frac{78 \text{ g/mole}}{13 \text{ g/mole}} \Rightarrow 6$$

$n = 6$.

$$\text{Molecular formula} = [\text{Empirical formula}]_n$$

Empirical formula = CH.

Molecular formula $= (CH)_6$

$= C_6H_6$.

Result :-

Molecular formula = C_6H_6. [Benzene]

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DEGREES of COMPARISON

* positive degree ⇒ shows the normal state of Equality
* comparative degree ⇒ shows a better state on comparison of two things or
* superlative degree ⇒ with other things. showing the best positio

Type I

Ravi is taller than Mani (comparative)
(ex) Mani is not so tall as Ravi (positive)

Aluminium is not so heavy as Iron (int com)
Iron is heavier than Aluminium
Sheela is not cleverer than Mala (com)
Mala is as clever as than Mala

Type II

Raghu is the tallest boy in the class (super)
(The elephant is the biggest animal (super)
No other boy in the class is so tall as Raghu CP)
Raghu is taller than any other boy in the class (com)
No other animal is so big as the elepha
The elephant is bigger than any other anim (CP)
[superlative, comparative ⇒ subject first positive ⇒ didn't come]

positive = No other
comparative = any other
superlative = the ... est

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Type - III

Sekar is one of the shortest boys in our street (super)

very few boys in our street are as short as Sekar (positive)

Sekar is shorter than many other boys in our stre (Comparative

positive - ~~No other~~ very few

Comparative - Many other (most other)

Superlative - one of the

1 Mumbai is bigger than many other cities in India (into s)

Mumbai is one of the biggest cities in India.

2 very few hill stations are as lovely as Kodaikanal (into co)

Kodaikanal is lovelier than most other hill stations

3 Tiger is one of the wildest animals in the forest (in po)

very few animals in the forest are as wild as Tiger.

Mala reads better than Leela [into positive]
Leela does not read so well/good as Mala.

Ravi did not run so fast as Sekar [into com]
[did + run] = ran
Sekar ran faster than Ravi

Shakespeare is the greatest dramatist of the world. (superlative)
Shakespeare is greater than any other dramat of the world. (comparative)
No other dramatist is as great as Shakespeare (po

China is the most populated country in the world (superlative)
China is the more populated any other country in the world (com)
No other country in the world is as popula so China.

Tom is stronger than any other student in our class (com)
Tom is the stongest of all students in ou Class. (sup)
No other student in our class is as strong a Tom (positive)

C. Ramapriya Assistant Professor of Chemistry

Rubbers.

Introduction:

Rubbers are classified into two types

(i) Natural Rubbers

(ii) Synthetic Rubbers.

Natural Rubbers:

Natural rubbers are obtained from a variety of tropical trees, shrubs and vines. The milky latex of the plants is actually an emulsion of several polyhydrocarbons in an aqueous medium. Several naturally occuring proteins, esters of fatty acids called lipids, etc., act as stabilizers for the emulsion.

Natural rubber is a linear, high molecular weight polymer of isoprene having a structural formula of $+[CH_2C(CH_3)=CH-CH_2]_n+$. The 'n' is usually in the range of 1,00,000 to 5,00,000. Charles Goodyear had found that rubber on heating with sulphur lost its plasticity and became elastic. The elastic form then could be molded into rubber articles. The process of treating rubber with sulphur and heating is called vulcanization.

By varying the rubber-sulphur ratio we can get a variety of grades of rubber. The automobile industry uses a grade with 2-3 percent sulphur, while ebonite, a variety, a very hard material, has rubber and sulphur in the ratio of 68:32. It is also known as elastomers. It differs from other polymers in two ways.

(i) The application of stress deforms it to a large extent without rupture.

(ii) It can recover spontaneously and almost completely upon removal of the stress.

(iii) The first synthetic rubbers to be commercially available in United States were Thiokol (1930) and Neoprene (1931). Both of these are still produced commercially because they have special properties that are matched by natural rubber.

Applications of rubber:

(i) In medicine it is used for making heart valves

(ii) To make tyres, conveyor belts.

(iii) Head band for goggles and helmets.

iv) Sponge rubber is used for shock absorption.

Synthetic rubber:

Synthetic high polymers possessing either the same or similar physical properties as that of natural rubber is called synthetic rubber. Usually synthetic rubber is an improvement over natural rubber, especially with respect to its resistance to oils, gas, solvent etc. Attempts to find out a synthetic substitute or natural rubber began very early. Faraday, in 1826 concluded that natural rubber was a hydrocarbon [C_5H_8 or $C_{10}H_{16}$]. Greville William (1860), obtained isoprene, a liquid from rubber. He considered rubber as a polymer of isoprene. But as sufficient amounts of natural rubber were available to meet the world demand, little efforts were made to produce a substitute of natural rubber. During the first world War (1918), there was a remarkable development of the synthetic rubber, when all waring nations, except Japan were in deficit of natural rubber.

S. Manikka Vasugi, Assistant Professor of Mathematics

Discrete Mathematics.

Unit - III.

TREES AND CUT-SETS.

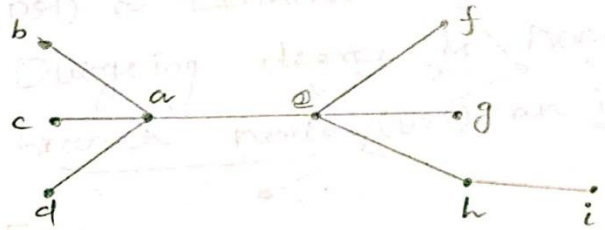
Definition:

We define a tree to be a connected (undirected) graph that contains no simple circuit.

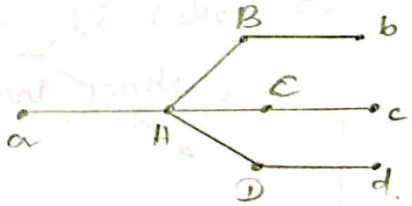
A collection of disjoint trees is called, a forest.

A vertex of degree 1 in a tree is called a leaf (or) a terminal node and a vertex of degree larger than 1 is called a branch node (or) an internal node.

Eg:



①



②

The vertices b, c, d, f, g and i in Fig.① are leaves.

The vertices e, a, h are branch nodes.

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Properties of trees:

1.) There is a unique path betn every two vertices in a tree.

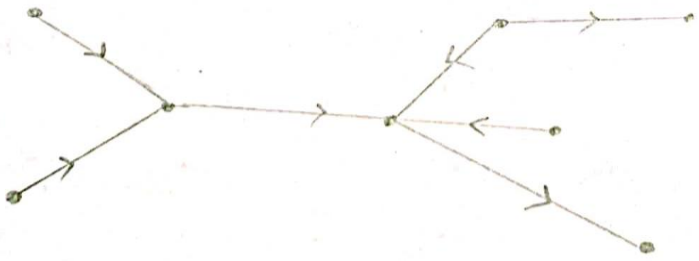
2.) The number of vertices is 01 more than the number of edges in a tr

3.) A tree with two (or) more vertices has atleast two leaves.

Rooted Trees:

A directed graph is said to be directed tree if it becomes a tree when directions of the edges are ignored.

Eg:

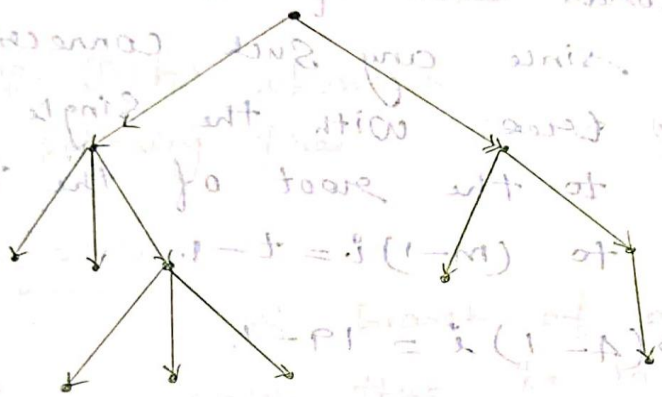


Definition:

A directed tree is called a rooted tree if there is exactly one ve whose incoming degree is 0, and the incomi

degrees of all other vertices are 1. The vertex with incoming degree 0 is called the root of the rooted tree.

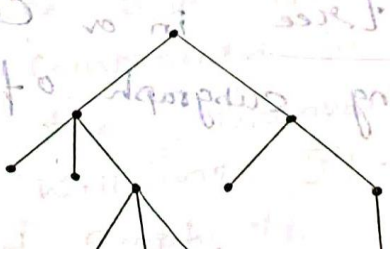
Eg,



Definition:

In a rooted tree, a vertex whose outgoing degree is 0 is called a leaf (or) a terminal node, and a vertex whose outgoing degree is non-zero is called a branch node (or) an internal node.

Eg:



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Computer Fundamentals

What is Computer?

Computer is an advanced electronic device that takes raw data as input from the user and processes these data under the control of set of instructions (called program) and gives the result (output) and saves output for the future use. It can process both numerical and non-numerical (arithmetic and logical) calculations.

A computer has four functions:

a. accepts data	*Input*
b. processes data	*Processing*
c. produces output	*Output*
d. stores results	*Storage*

Input (Data):

Input is the raw information entered into a computer from the input devices. It is the collection of letters, numbers, images etc.

Process:

Process is the operation of data as per given instruction. It is totally internal process of the computer system.

Output:

Output is the processed data given by computer after data processing. Output is also called as Result. We can save these results in the storage devices for the future use.

Computer System

All of the components of a computer system can be summarized with the simple equations.

COMPUTER SYSTEM = HARDWARE + SOFTWARE+ USER

- Hardware = Internal Devices + Peripheral Devices
  All physical parts of the computer (or everything that we can touch) are known as Hardware.
- Software = Programs
  Software gives "intelligence" to the computer.
- USER = Person, who operates computer.

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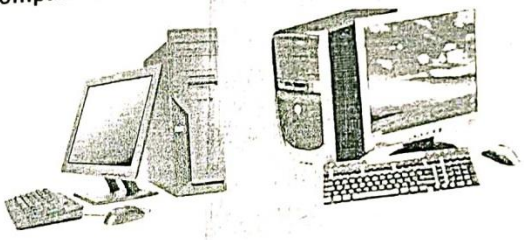
e) Workstations

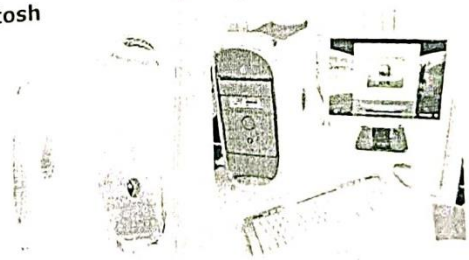
A terminal or desktop computer in a network. In this context, workstation is just a generic term for a user's machine (client machine) in contrast to a "server" or "mainframe."

On the basis of Brand

a) IBM/IBM Compatible Computers



c) Apple/Macintosh



Booting

The process of loading the system files of the operating system from the disk into the computer memory to complete the circuitry requirement of the computer system is called booting. The system files of MS. DOS are:

Types of Booting:

There are two types of booting:

- **Cold Booting:** If the computer is in off state and we boot the computer by pressing the power switch 'ON' from the CPU box then it is called as cold booting.

- **Warm Booting:** If the computer is already 'ON' and we restart it by pressing the 'RESET' button from the CPU box or CTRL, ALT and DEL key simultaneously from the keyboard then it is called warm booting.

How to start the Computer in Ms. Windows mode?

There is nothing special you need to start this system. Just,

1. Switch ON the Power Supply.
2. Switch ON the CPU and,
3. Switch ON the Screen (Monitor).

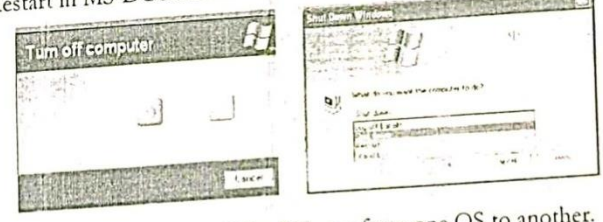
How to Shutdown (Turn Off) the Computer?

Before shutting down the Computer, close all opened windows at first. Then,

1. Click on Start button.
2. Click on Shutdown (Turn Off Computer).

Then, Computer asks you:
What do you want the Computer to do?

- Standby
- Shutdown (Turn Off)
- Restart
- Restart in MS-DOS mode.



Note: The options will be different from one OS to another.

3. Choose 2nd option (i.e. Shutdown/Turn Off).
4. Click on OK.

Then, wait until the message "It's now safe to turn off your Computer".

5. Then, Switch Off the screen.
6. Switch Off the CPU.
7. At last, Switch Off the power supply.

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virtual learning environment

A virtual learning environment is an online based platform that offers students and professors digital solutions that enhance the learning experience

A virtual learning environment refers to a system that offers educators digitally - based solutions aimed at creating interactive, active learning environment.

Benefits
- Increased inclusivity & accessibility
- Improved technical skills
- Expanded world view
- Immediate feedback on learning
- Greater flexibility and comfort.

Improved accessibility
→ the practice of people making your website usable by as many people as possible.

Web - based learning ← online learning / e-learning

↓ learning tool

to support ← formal programmes delivering online learning programmes

Main barries - poor access & slow downloading

discussion forums → via e-mail, videoconferencing, and live lectures (videostreaming) all are possible through the web.

↓ a meeting at which people can exchange ideas & opinions about the topic

⇒ One of the values of using the web to access course materials is that web pages may contain hyperlinks to other parts of the web,

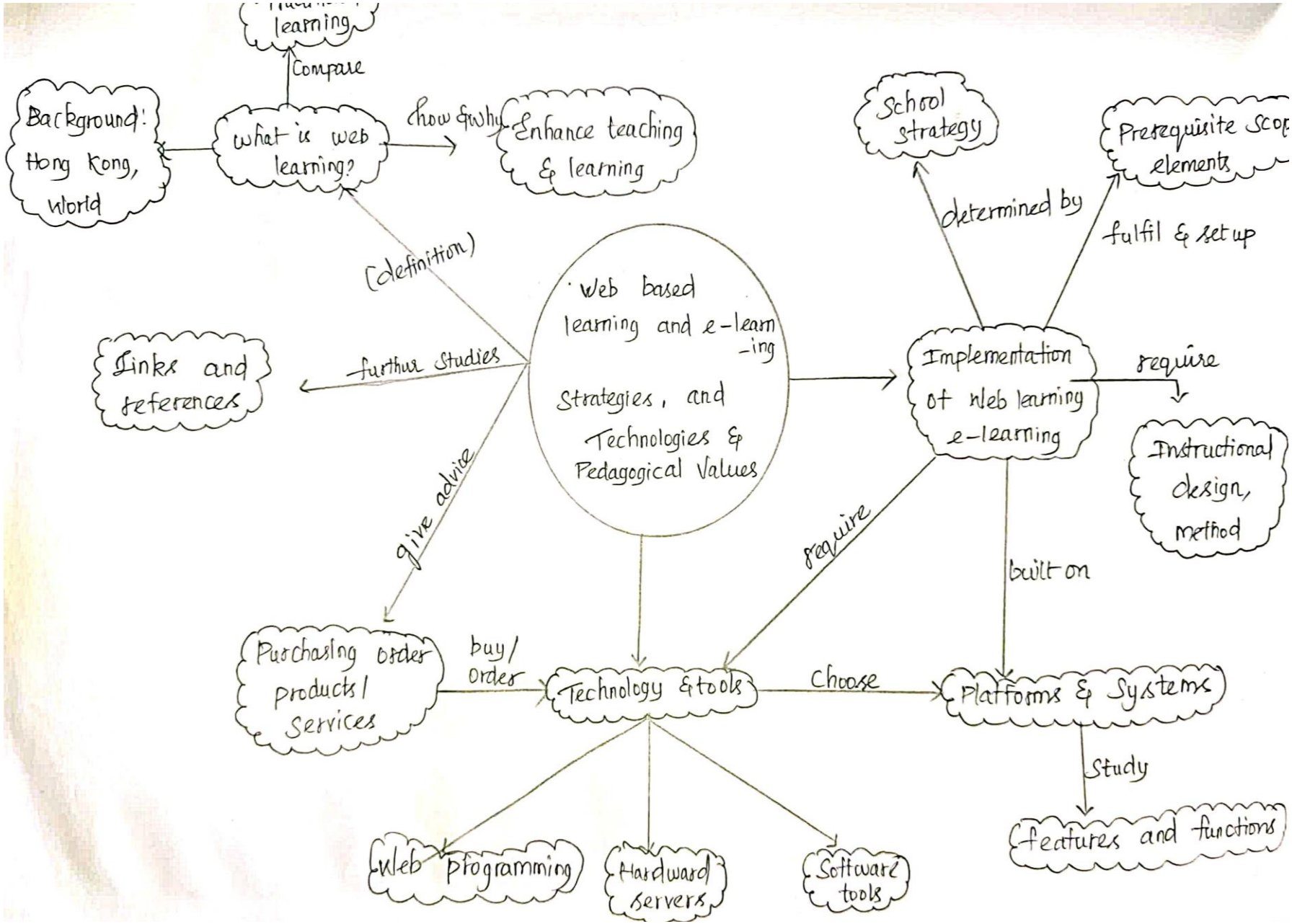
↓

Links in web pages that enable the user to access another web page (either same or a different site)

Models of Web based learning

Managed learning Environment is an all in one teaching and learning Software package.

⇒ A VLE typically combines functions such as discussion boards, Chat rooms, online assessment, tracking of students use of the web.


learning
Compare
Background: Hong Kong, World
what is web learning?
How & Why
Enhance teaching & learning
(definition)
Web based learning and e-learning
Strategies, and Technologies & Pedagogical Values
Links and references
further studies
give advice
School strategy
Prerequisite scop elements
determined by
fulfil & set up
Implementation of web learning e-learning
require
Instructional design, method
built on
require
Purchasing order products/ services
buy/ order
Technology & tools
Choose
Platforms & Systems
Study
features and functions
Web programming
Hardward servers
Software tools